

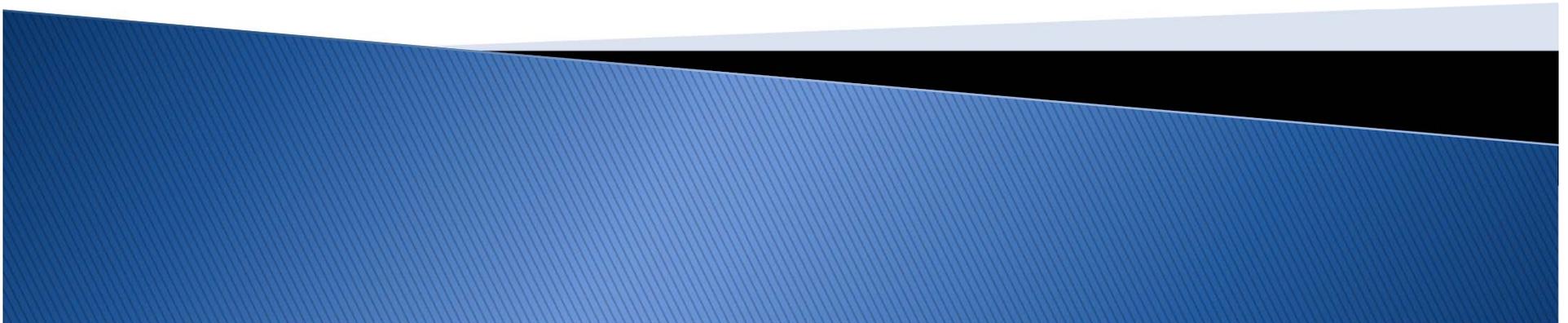
Telehealth & Telemedicine:

Past, Present, and Future of the Technology & Application in Public Health and Clinical Service

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Objectives

At the end of the session participants will be able to:

- 1) Explain what is telehealth and telemedicine
- 2) Summarize the current state of telehealth in medical practices
- 3) Describe clinical, public health and educational applications of telehealth/telemedicine



World Health Organization (WHO)

Definition of Telemedicine

“The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities”



Telemedicine

WHO: Four elements germane to telemedicine

1. Purpose to provide clinical support
2. Intent to overcome:
 - Geographical barriers
 - Connecting users who are not in the same physical location
3. Involves the use of various types of ICT
4. Goal to improve health outcomes



HRSA's Definition of Telehealth

“The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration”



Differences

Telemedicine and Telehealth

- Telemedicine:
 - Refers specifically to **remote clinical services**
- Telehealth:
 - Refers to a **broader scope of remote healthcare services** than telemedicine
 - Refers to remote **non-clinical services**, such as provider training, administrative meetings, and CME



Telemonitoring

*“The process of using audio, video, and other telecommunications and electronic information processing technologies to **monitor the health status of a patient from a distance**”*



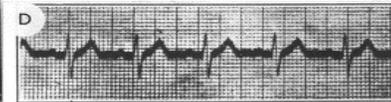
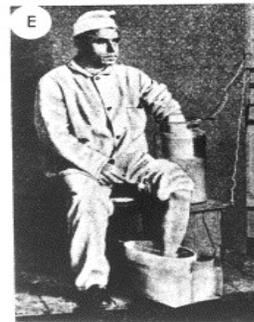
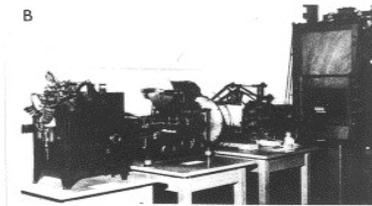
Telecare and Telehomecare

A lot of these terms are interchangeable telemanagement, telemonitoring, telenursing, telehealth, telecare and telehome health – lets not get bogged down in the terminology!

Telecare and Telehomecare (care for patients at home):
The use of **communications technologies**, together with remote **measurement and monitoring devices**, to **evaluate specific health parameters of out-patients** and provide them with advice and/or feedback about their condition

Telemedicine Pioneer

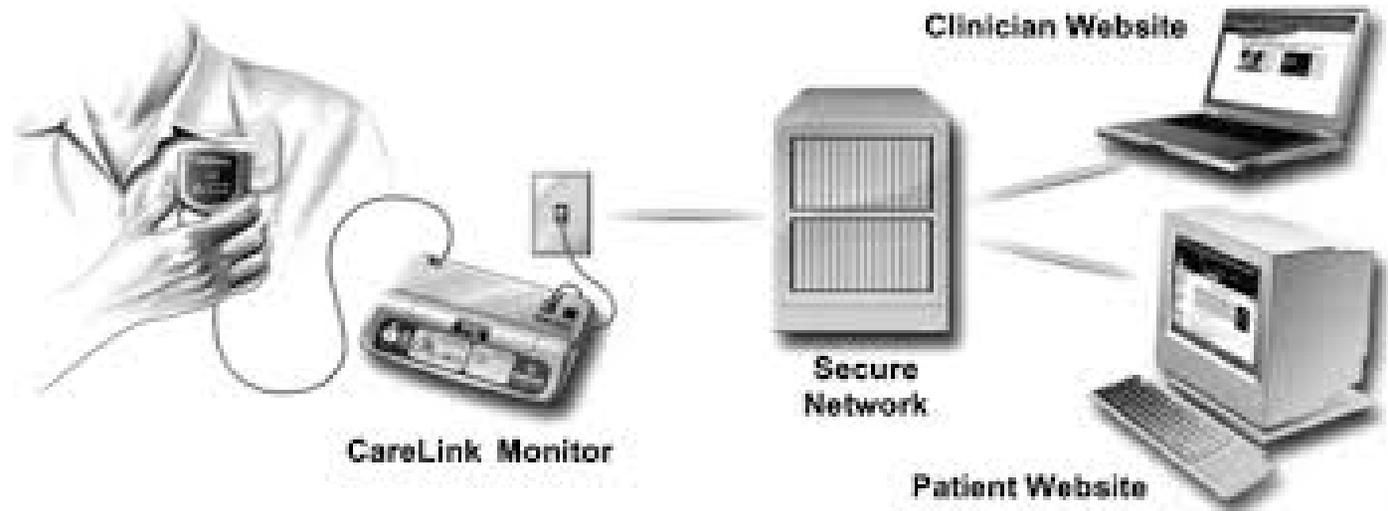
Dr. Willem Einthoven, the inventor of the EKG, sent an EKG over telephone lines in 1906, started the Era of Telemedicine



Telemedicine Has Come A Long Way!



Earlier Technology Used



- Vital Signs

- Monitoring Devices

- Standard care over the last 2-3 decades

- Invasive: PM, AICD/CRT through telephone lines

- Non-invasive: Holter, Ambulatory Cardiac Monitors (ACM)

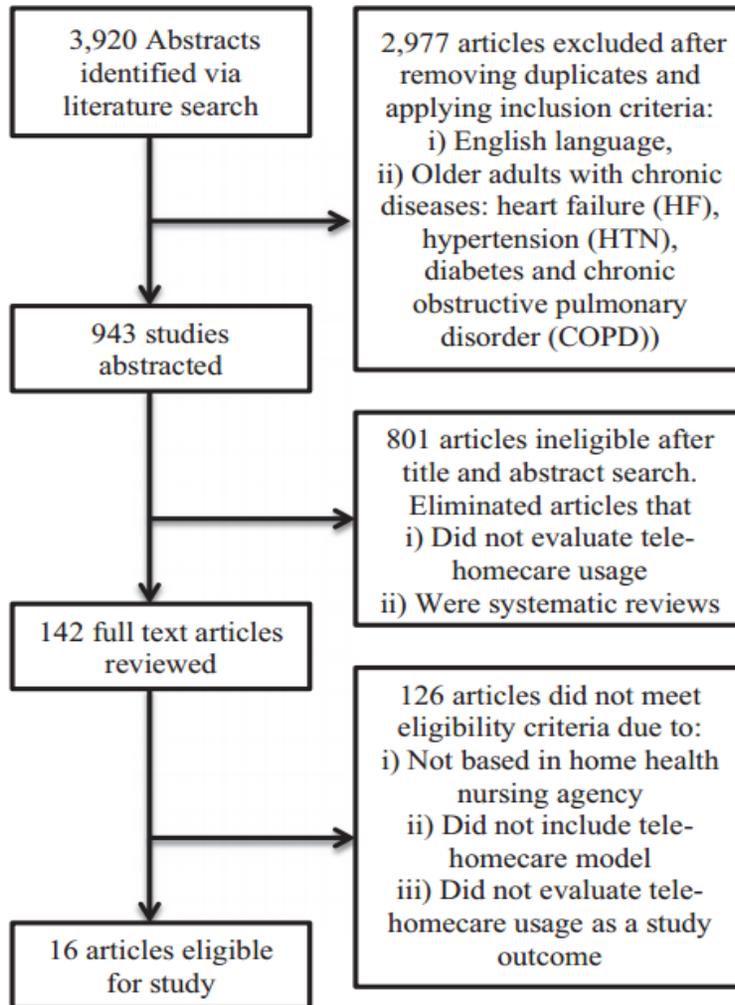
- 2-4 leads

- 24x7 real-time remote monitoring for day(s) - 30 days and over

- Record, store-and-forward

Literature

Figure 1: Literature Search Flow Diagram



- 1996-2013: 18 yrs. literature
- Focus on Telehomecare
 - Chronic Diseases:
 - CHF, COPD, DM
- Address Sustainability:
 - Continued use w/ demand
 - Acceptance of services
 - Commitment to invest



Barriers and Facilitators for
Sustainability of Tele-Homecare
Programs: A Systematic Review 2/2016

Kavita Radhakrishnan, Bo Xie, Amy Berkley, and Miyong Kim

Summarized

Sustainability of Telemedicine found to be influenced by:

- Homecare nurses’/patients’ **perceptions on effectiveness**:
Patients were more positive / nurses less due to Physician interactions;
- **Clinical and behavioral outcomes**;
- The degree **tailored to patient-centered** factors & needs;
- The role played by programs in nurse–patient communication;
- **Organizational culture** and process within home health agencies;
- **Quality** of the telehomecare technology.

Present Technology

New Drugs and Technologies

Novel Wireless Devices for Cardiac Monitoring

Joseph A. Walsh III, MD, MS; Eric J. Topol, MD; Steven R. Steinhubl, MD

8/12/2014

Device Categories	Wireless
Comprehensive Vitals	Tm, BP, HR, RR, PO _x , Wt., Posture/Position, Activities
Intermittent ECG	1 or 3 leads ECG
Prolonged ECG Monitor	14-30 days monitoring
CHF	Heart Rate variability, fluid level/impedance, Questionnaire
Ultrasound	Standalone ultrasound imaging device



Present Technology

Connections in ECG Process	Traditional	Wireless
ECG Machine – Display	Connected	Remote
ECG Leads – Machine	Connected	Wired or Not-Wired

